

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
GAMMA ANALYSES**

REPORT OF SAMPLE DELIVERY GROUP #1100248

Project: Dimock Residential GW Site, Dimock, PA
 Analysis method: Gamma Spectrometry
 Report ID: 1100248-GAMMA
 Report type: Original
 Date reported: 03/29/2012
 Total pages in report: 30

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B2.01731G	HW49	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01732H	FB14	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01733J	HW21Z	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01734K	HW22	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01735L	HW44	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01736M	HW36N	PA:DIMOCK	WATER-DRINKING	02/10/2012	02/13/2012
B2.01737N	HW54	PA:DIMOCK	WATER-DRINKING	02/10/2012	02/13/2012
B2.01761N	HW55	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/14/2012
B2.01762P	FB16	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/14/2012
B2.01763Q	HW27	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/14/2012
B2.01777X	FB17	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01778Y	HW57	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01779Z	HW03	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01780R	HW03Z	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01781T	HW58	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01782U	HW11	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/15/2012
B2.01783V	HW27Z	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/15/2012
B2.01784W	HW53	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/15/2012
B2.01785X	HW59	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01877A	HW07	PA:DIMOCK	WATER-DRINKING	02/15/2012	02/16/2012

EXCEPTIONS

- Packaging and shipping**—No problems were observed.
- Documentation**— NAREL originally agreed to analyze 71 samples for this project, but sample collectors collected and shipped more samples than expected. NAREL then agreed to analyze 100 samples, which would make five batches of 20 for QC purposes. Actually 101 samples were received. With the client's permission, NAREL did not analyze the field blank received in the last shipment thus making the agreed upon total of 100 samples for analysis.
- Sample preparation**—No problems were encountered.
- Analysis**— NAREL normally assumes that the radon daughter nuclides Pb-214 and Bi-214 in environmental matrices are in equilibrium with Ra-226 and therefore decay corrects the concentrations of those nuclides using the 1,600 year Ra-226 half life. For this project, the results of gross alpha/beta and radium analysis are inconsistent with that assumption, and the observed decay rate between replicate gamma analyses of the same aliquant performed on different days indicates that the parent contaminant is dissolved radon gas rather than

Ra-226. Pb-214 and Bi-214 concentrations in water samples for this project were therefore decay corrected to the time of sample collection using the 3.842 day half life of their parent nuclide, Rn-222. Radon is known to slowly escape from plastic sample containers, therefore the actual concentrations at the time of sampling are likely higher than the measured concentrations. As stated earlier, a replicate analysis on the same sample performed at a later time would be expected to result in somewhat lower measured Pb-214 and Bi-214 concentrations than the initial analysis.

Also, the gamma analyst used two different commercial software systems to analyze different samples in the same QC batch in order to keep turnaround times short. One software system calculates a minimum detectable concentration (MDC) but the other does not. NAREL is reporting the results as generated in this data package, but at the client's request NAREL will reanalyze the affected samples. However, the unsupported radon and its progeny will have decayed even more.

5. **Holding times**—No holding times were specified.

QUALITY CONTROL

1. **QC samples**—All QC analysis results met NAREL acceptance criteria.
2. **Instruments**—Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

for Mary F. Wisdom 3/29/12
Mary F. Wisdom
Quality Assurance Manager, NAREL
Date

John Cynthia White (Acting CERLS Dir) 3-29-12
John G. Griggs, Ph.D.
Director, Center for Environmental Radioanalytical
Laboratory Science
Date

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Method blank

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "Z scores." A Z score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The Z score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The Z score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the Z score is computed.

Each standard uncertainty used to compute a Z score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

GENERAL INFORMATION (CONTINUED)

GAMMA ANALYSIS

The reporting format lists the gamma emitters in alphabetical order. The activity, 2-sigma uncertainty, and a sample-specific estimate of the MDC for radionuclides measured by gamma spectroscopy are reported only if the nuclide is detected above background with the exception of client requested nuclides of interest. The activity for each of the requested nuclides is reported whether negative, positive, or zero along with the associated 2-sigma uncertainty.

For this group of samples, NAREL used two different gamma analysis software systems. One system provides a sample-specific estimate of the MDC for every sample result. The other does not. The reader can tell which software was used for a particular sample by looking at the column labeled "MDC."

Due to potential spectral interferences and other possible problems associated with the determination of the activity of certain radionuclides, the activities for Bi-214, Pb-214, Th-234, Pa-234m, Ra-226, Th-231, and U-235 are subject to greater possible uncertainty than other commonly reported radionuclides. It should be noted that this potential uncertainty is not included in the two-sigma counting uncertainty which is reported with each activity. Although in this report we do provide the calculated activities for these radionuclides, we recommend that the results be used only as a qualitative means of indicating the presence of these radionuclides and not as a quantitative measure of their concentration. The results for these nuclides are not used in the evaluation of quality control samples. Furthermore, because of mutual interference between Ra-226 and U-235, NAREL's gamma analysis software tends to overestimate the amounts of these nuclides whenever both are present in a sample. Lower estimates for Ra-226 activities can be obtained from the reported activities of its decay products, Pb-214 and Bi-214, which are likely to be somewhat less than the Ra-226 activity because of the potential escape of radon gas.

NAREL's gamma spectroscopy software corrects activities and MDCs for decay between collection and analysis, but only up to a limit of ten half-lives. So, if the decay time for a sample is more than ten half-lives of a radionuclide, that nuclide will almost always be undetected and the reported MDC will be meaningless. This is usually a problem only for short-lived radionuclides, such as I-131 and Ba-140, when there is a long delay between collection and analysis.

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NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

ANALYSIS SUMMARY

Analysis Procedure: NAREL GAM-01
 Title: Gamma Spectrometry

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
B2.01731G		N/A	02/27/2012	0015743M	0008495N
B2.01732H		N/A	02/25/2012	0015743M	0008495N
B2.01733J		N/A	02/25/2012	0015743M	0008495N
B2.01734K		N/A	02/25/2012	0015743M	0008495N
B2.01735L		N/A	02/27/2012	0015743M	0008495N
B2.01736M		N/A	02/28/2012	0015743M	0008495N
B2.01737N		N/A	02/28/2012	0015743M	0008495N
B2.01761N		N/A	02/28/2012	0015743M	0008495N
B2.01762P		N/A	02/28/2012	0015743M	0008495N
B2.01763Q		N/A	02/28/2012	0015743M	0008495N
B2.01777X		N/A	02/28/2012	0015743M	0008495N
B2.01778Y		N/A	02/28/2012	0015743M	0008495N
B2.01779Z		N/A	02/29/2012	0015743M	0008495N
B2.01780R		N/A	02/25/2012	0015743M	0008495N
B2.01780R	DUP	N/A	02/25/2012	0015743M	0008495N
B2.01781T		N/A	02/29/2012	0015743M	0008495N
B2.01782U		N/A	02/29/2012	0015743M	0008495N
B2.01783V		N/A	02/29/2012	0015743M	0008495N
B2.01784W		N/A	02/29/2012	0015743M	0008495N
B2.01785X		N/A	02/29/2012	0015743M	0008495N
B2.01877A		N/A	02/29/2012	0015743M	0008495N
LCS-00631915X *	LCS	N/A	02/29/2012	0015743M	0008495N
RBK-00631916Y *	RBK	N/A	02/28/2012	0015743M	0008495N

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

PREPARATION METHOD(S) USED

Procedure ID	Title

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SAMPLE ANALYSIS REPORT

Sample #:	B2.01731G	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/27/2012 10:52	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2\sigma$ Uncertainty	MDC	Unit	Date
Bi212	6.69e+00	1.3e+01	2.1e+01	PCI/L	02/09/2012 14:11 EST
Bi214 *	5.62e+02	1.0e+02	9.6e+01	PCI/L	02/09/2012 14:11 EST
K40	-7.63e+00	1.3e+01	1.8e+01	PCI/L	02/09/2012 14:11 EST
Pb214 *	6.13e+02	1.1e+02	1.1e+02	PCI/L	02/09/2012 14:11 EST
Ra226 *	-1.87e+01	1.5e+02	5.4e+01	PCI/L	02/09/2012 14:11 EST
Ra228	1.42e+00	3.0e+00	5.7e+00	PCI/L	02/09/2012 14:11 EST
Th234	-1.47e+02	4.6e+03	3.4e+02	PCI/L	02/09/2012 14:11 EST
U235 *	2.35e-01	1.2e+01	1.9e+01	PCI/L	02/09/2012 14:11 EST

* An asterisk indicates a result that may be significantly under or overestimated

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01732H	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/24/2012 15:06	1000.0	GE15	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2\sigma$ Uncertainty	MDC	Unit	Date
Bi212	-4.47e+00	1.7e+01		PCI/L	02/09/2012 13:36 EST
Bi214 *	-2.62e+01	4.9e+01		PCI/L	02/09/2012 13:36 EST
K40	7.29e+00	1.3e+01		PCI/L	02/09/2012 13:36 EST
Pb212	4.87e+00	2.6e+00		PCI/L	02/09/2012 13:36 EST
Pb214 *	2.61e+00	4.8e+01		PCI/L	02/09/2012 13:36 EST
Ra226 *	6.19e+00	3.2e+01		PCI/L	02/09/2012 13:36 EST
Ra228	-5.69e+00	5.1e+00		PCI/L	02/09/2012 13:36 EST
Th234 *	6.08e+01	3.3e+01		PCI/L	02/09/2012 13:36 EST
Tl208	9.53e-01	1.2e+00		PCI/L	02/09/2012 13:36 EST
U235 *	-2.62e+01	8.2e+00		PCI/L	02/09/2012 13:36 EST

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**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01733J	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/24/2012 15:06	1000.0	GE16	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2\sigma$ Uncertainty	MDC	Unit	Date
Bi212	-6.20e+00	1.1e+01		PCI/L	02/09/2012 10:53 EST
Bi214 *	4.89e+02	6.8e+01		PCI/L	02/09/2012 10:53 EST
K40	2.17e+00	1.1e+01		PCI/L	02/09/2012 10:53 EST
Pb212 *	-3.78e+00	1.4e+00		PCI/L	02/09/2012 10:53 EST
Pb214 *	4.81e+02	6.5e+01		PCI/L	02/09/2012 10:53 EST
Ra226 *	-1.68e+00	2.1e+01		PCI/L	02/09/2012 10:53 EST
Ra228	-1.36e+00	2.9e+00		PCI/L	02/09/2012 10:53 EST
Th234 *	-4.32e+01	2.2e+01		PCI/L	02/09/2012 10:53 EST
U235 *	-2.13e+01	5.5e+00		PCI/L	02/09/2012 10:53 EST

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**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01734K	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/24/2012 15:07	1000.0	GE22	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	3.73e+00	1.4e+01		PCI/L	02/09/2012 10:42 EST
Bi214 *	3.09e+02	5.5e+01		PCI/L	02/09/2012 10:42 EST
K40	7.77e+00	1.2e+01		PCI/L	02/09/2012 10:42 EST
Pb212 *	-4.56e+00	2.1e+00		PCI/L	02/09/2012 10:42 EST
Pb214 *	3.86e+02	5.8e+01		PCI/L	02/09/2012 10:42 EST
Ra226 *	5.38e+00	1.8e+01		PCI/L	02/09/2012 10:42 EST
Ra228	-4.14e+00	4.6e+00		PCI/L	02/09/2012 10:42 EST
Th234 *	-4.95e+01	3.2e+01		PCI/L	02/09/2012 10:42 EST
U235 *	-8.90e+00	6.2e+00		PCI/L	02/09/2012 10:42 EST

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**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01735L	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/27/2012 15:54	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	7.91e+00	1.2e+01	2.0e+01	PCI/L	02/09/2012 14:49 EST
Bi214 *	6.16e+02	1.0e+02	9.5e+01	PCI/L	02/09/2012 14:49 EST
K40	2.11e+00	1.2e+01	1.9e+01	PCI/L	02/09/2012 14:49 EST
Pb214 *	6.52e+02	1.2e+02	1.2e+02	PCI/L	02/09/2012 14:49 EST
Ra226 *	-3.33e+00	3.9e+01	5.3e+01	PCI/L	02/09/2012 14:49 EST
Ra228	1.70e+00	3.8e+00	5.5e+00	PCI/L	02/09/2012 14:49 EST
Th234	-4.82e+01	4.1e+02	3.3e+02	PCI/L	02/09/2012 14:49 EST
U235 *	-5.09e+00	1.1e+01	1.8e+01	PCI/L	02/09/2012 14:49 EST

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**U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01736M	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/27/2012 20:56	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2\sigma$ Uncertainty	MDC	Unit	Date
Bi212	-1.44e+00	1.2e+01	2.0e+01	PCI/L	02/10/2012 10:53 EST
Bi214 *	1.22e+02	6.6e+01	8.6e+01	PCI/L	02/10/2012 10:53 EST
K40	2.00e+00	1.3e+01	1.9e+01	PCI/L	02/10/2012 10:53 EST
Pa234m	1.08e+02	8.5e+01	1.3e+02	PCI/L	02/10/2012 10:53 EST
Pb214 *	1.48e+02	6.7e+01	9.0e+01	PCI/L	02/10/2012 10:53 EST
Ra226 *	-1.50e+01	9.3e+01	5.1e+01	PCI/L	02/10/2012 10:53 EST
Ra228	-5.25e-01	3.6e+00	5.9e+00	PCI/L	02/10/2012 10:53 EST
Th234	-9.09e+01	9.0e+02	2.9e+02	PCI/L	02/10/2012 10:53 EST
U235 *	-1.06e+00	1.3e+01	1.7e+01	PCI/L	02/10/2012 10:53 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100248
SAMPLE ANALYSIS REPORT**

Sample #:	B2.01737N	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/27/2012 14:31	1000.0	GE03	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	1.73e+01	1.4e+01		PCI/L	02/10/2012 14:08 EST
Bi214 *	1.13e+03	1.5e+02		PCI/L	02/10/2012 14:08 EST
K40	1.55e+01	1.6e+01		PCI/L	02/10/2012 14:08 EST
Pb212 *	-6.35e+00	2.8e+00		PCI/L	02/10/2012 14:08 EST
Pb214 *	1.10e+03	1.4e+02		PCI/L	02/10/2012 14:08 EST
Ra226 *	1.86e+01	3.3e+01		PCI/L	02/10/2012 14:08 EST
Ra228 *	-6.11e-02	5.3e+00		PCI/L	02/10/2012 14:08 EST
Th234 *	-7.07e+00	5.6e+01		PCI/L	02/10/2012 14:08 EST
U235 *	-1.56e+01	9.5e+00		PCI/L	02/10/2012 14:08 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100248
SAMPLE ANALYSIS REPORT**

Sample #:	B2.01761N	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/27/2012 14:31	1000.0	GE15	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	2.31e+00	1.7e+01		PCI/L	02/13/2012 10:21 EST
Bi214 *	3.44e+02	5.5e+01		PCI/L	02/13/2012 10:21 EST
K40	7.97e+00	1.3e+01		PCI/L	02/13/2012 10:21 EST
Pb212	2.76e+00	2.6e+00		PCI/L	02/13/2012 10:21 EST
Pb214 *	3.81e+02	5.7e+01		PCI/L	02/13/2012 10:21 EST
Ra226 *	5.04e+00	3.3e+01		PCI/L	02/13/2012 10:21 EST
Ra228	-3.34e+00	5.3e+00		PCI/L	02/13/2012 10:21 EST
Th234 *	4.17e+01	3.3e+01		PCI/L	02/13/2012 10:21 EST
U235 *	-2.60e+01	8.5e+00		PCI/L	02/13/2012 10:21 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100248
SAMPLE ANALYSIS REPORT**

Sample #:	B2.01762P	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/27/2012 14:31	1000.0	GE16	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	-1.20e+00	9.7e+00		PCI/L	02/13/2012 09:06 EST
Bi214 *	-4.52e+00	3.3e+01		PCI/L	02/13/2012 09:06 EST
K40	1.91e+00	9.9e+00		PCI/L	02/13/2012 09:06 EST
Pb212	1.29e+00	1.2e+00		PCI/L	02/13/2012 09:06 EST
Pb214 *	-5.30e+00	2.9e+01		PCI/L	02/13/2012 09:06 EST
Ra226 *	3.82e+00	1.9e+01		PCI/L	02/13/2012 09:06 EST
Ra228	1.25e+00	2.5e+00		PCI/L	02/13/2012 09:06 EST
Th234 *	-2.31e+01	2.0e+01		PCI/L	02/13/2012 09:06 EST
U235 *	-2.00e+01	5.1e+00		PCI/L	02/13/2012 09:06 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100248
SAMPLE ANALYSIS REPORT**

Sample #:	B2.01763Q	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/27/2012 14:31	1000.0	GE22	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	2.56e+00	1.4e+01		PCI/L	02/13/2012 10:37 EST
Bi214 *	2.55e+02	4.6e+01		PCI/L	02/13/2012 10:37 EST
K40	2.78e+00	1.2e+01		PCI/L	02/13/2012 10:37 EST
Pb212 *	-4.82e+00	2.1e+00		PCI/L	02/13/2012 10:37 EST
Pb214 *	2.63e+02	4.4e+01		PCI/L	02/13/2012 10:37 EST
Ra226 *	4.09e+00	1.8e+01		PCI/L	02/13/2012 10:37 EST
Ra228	-2.25e+00	4.5e+00		PCI/L	02/13/2012 10:37 EST
Th234 *	-5.03e+01	3.1e+01		PCI/L	02/13/2012 10:37 EST
U235 *	-9.93e+00	6.2e+00		PCI/L	02/13/2012 10:37 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01777X	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/28/2012 11:23	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	3.10e+00	1.1e+01	1.8e+01	PCI/L	02/14/2012 09:09 EST
Bi214 *	3.81e+01	3.5e+01	4.8e+01	PCI/L	02/14/2012 09:09 EST
K40	-2.19e+00	1.4e+01	1.9e+01	PCI/L	02/14/2012 09:09 EST
Pb214 *	9.69e+00	3.4e+01	6.0e+01	PCI/L	02/14/2012 09:09 EST
Ra226 *	-5.55e+00	4.3e+01	5.0e+01	PCI/L	02/14/2012 09:09 EST
Ra228	-1.37e+00	4.6e+00	5.2e+00	PCI/L	02/14/2012 09:09 EST
Th234	-2.53e+02	4.6e+02	2.8e+02	PCI/L	02/14/2012 09:09 EST
U235 *	-3.99e+00	1.1e+01	1.7e+01	PCI/L	02/14/2012 09:09 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01778Y	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/28/2012 16:25	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	-2.02e-01	1.3e+01	2.1e+01	PCI/L	02/14/2012 10:07 EST
Bi214 *	5.26e+02	7.4e+01	5.0e+01	PCI/L	02/14/2012 10:07 EST
K40	-1.15e+00	1.2e+01	1.9e+01	PCI/L	02/14/2012 10:07 EST
Pb214 *	5.91e+02	8.6e+01	6.0e+01	PCI/L	02/14/2012 10:07 EST
Ra226 *	-8.84e-01	3.4e+01	5.4e+01	PCI/L	02/14/2012 10:07 EST
Ra228	-6.14e-01	4.1e+00	5.4e+00	PCI/L	02/14/2012 10:07 EST
Th234	-4.43e+01	3.9e+02	3.1e+02	PCI/L	02/14/2012 10:07 EST
U235 *	2.76e-01	1.2e+01	1.9e+01	PCI/L	02/14/2012 10:07 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01779Z	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/28/2012 21:27	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	3.74e+00	1.1e+01	1.9e+01	PCI/L	02/14/2012 15:18 EST
Bi214 *	1.58e+02	4.1e+01	4.8e+01	PCI/L	02/14/2012 15:18 EST
K40	1.00e+00	1.1e+01	1.8e+01	PCI/L	02/14/2012 15:18 EST
Pb214 *	1.84e+02	5.4e+01	6.2e+01	PCI/L	02/14/2012 15:18 EST
Ra226 *	3.78e+00	2.9e+01	5.0e+01	PCI/L	02/14/2012 15:18 EST
Ra228	-2.83e+00	7.0e+00	5.6e+00	PCI/L	02/14/2012 15:18 EST
Th234	-7.61e+01	7.5e+02	3.0e+02	PCI/L	02/14/2012 15:18 EST
U235 *	-1.59e+00	1.3e+01	1.9e+01	PCI/L	02/14/2012 15:18 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01780R	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/24/2012 15:06	1000.0	GE03	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	1.36e+01	1.4e+01		PCI/L	02/14/2012 15:19 EST
Bi214 *	2.02e+02	3.0e+01		PCI/L	02/14/2012 15:19 EST
K40	5.63e+00	1.6e+01		PCI/L	02/14/2012 15:19 EST
Pb212	-2.54e+00	2.6e+00		PCI/L	02/14/2012 15:19 EST
Pb214 *	1.83e+02	2.7e+01		PCI/L	02/14/2012 15:19 EST
Ra226 *	-8.99e+00	3.3e+01		PCI/L	02/14/2012 15:19 EST
Ra228	2.44e+00	5.3e+00		PCI/L	02/14/2012 15:19 EST
Th234 *	9.14e+00	5.4e+01		PCI/L	02/14/2012 15:19 EST
U235 *	-1.38e+01	9.3e+00		PCI/L	02/14/2012 15:19 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01780R	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/24/2012 15:07	1000.0	GE18	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	8.42e-01	4.0e+01		PCI/L	02/14/2012 15:19 EST
Bi214 *	1.80e+02	4.2e+01		PCI/L	02/14/2012 15:19 EST
K40	-3.73e+00	2.9e+01		PCI/L	02/14/2012 15:19 EST
Pb212 *	-7.01e+00	4.7e+00		PCI/L	02/14/2012 15:19 EST
Pb214 *	2.05e+02	3.9e+01		PCI/L	02/14/2012 15:19 EST
Ra226 *	7.41e+00	3.4e+01		PCI/L	02/14/2012 15:19 EST
Ra228	-1.92e+01	1.5e+01		PCI/L	02/14/2012 15:19 EST
Th234 *	-9.00e+01	6.4e+01		PCI/L	02/14/2012 15:19 EST
U235 *	-1.14e+01	9.9e+00		PCI/L	02/14/2012 15:19 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01781T	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/28/2012 15:34	1000.0	GE03	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212 *	5.62e+00	1.4e+01		PCI/L	02/14/2012 14:47 EST
Bi214 *	4.50e+02	6.5e+01		PCI/L	02/14/2012 14:47 EST
K40	-6.13e+00	1.6e+01		PCI/L	02/14/2012 14:47 EST
Pb212 *	-4.80e+00	2.6e+00		PCI/L	02/14/2012 14:47 EST
Pb214 *	4.70e+02	6.5e+01		PCI/L	02/14/2012 14:47 EST
Ra226 *	6.82e+00	3.2e+01		PCI/L	02/14/2012 14:47 EST
Ra228	-1.97e+00	5.5e+00		PCI/L	02/14/2012 14:47 EST
Th234 *	1.12e+01	5.4e+01		PCI/L	02/14/2012 14:47 EST
U235 *	-1.81e+01	9.4e+00		PCI/L	02/14/2012 14:47 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01782U	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/28/2012 15:34	1000.0	GE15	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	4.80e+00	1.7e+01		PCI/L	02/13/2012 15:05 EST
Bi214 *	6.32e+02	8.7e+01		PCI/L	02/13/2012 15:05 EST
K40	5.94e+00	1.3e+01		PCI/L	02/13/2012 15:05 EST
Pb212	2.91e+00	2.7e+00		PCI/L	02/13/2012 15:05 EST
Pb214 *	6.73e+02	9.1e+01		PCI/L	02/13/2012 15:05 EST
Ra226 *	5.91e+00	3.3e+01		PCI/L	02/13/2012 15:05 EST
Ra228	7.84e-01	5.3e+00		PCI/L	02/13/2012 15:05 EST
Th234 *	4.03e+01	3.4e+01		PCI/L	02/13/2012 15:05 EST
U235 *	-2.95e+01	8.9e+00		PCI/L	02/13/2012 15:05 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01783V	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/28/2012 15:34	1000.0	GE16	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	9.25e-01	9.8e+00		PCI/L	02/13/2012 10:38 EST
Bi214 *	4.10e+02	6.0e+01		PCI/L	02/13/2012 10:38 EST
K40	6.38e-01	1.1e+01		PCI/L	02/13/2012 10:38 EST
Pb212 *	-3.17e+00	1.4e+00		PCI/L	02/13/2012 10:38 EST
Pb214 *	3.84e+02	5.5e+01		PCI/L	02/13/2012 10:38 EST
Ra226 *	-7.76e+00	2.0e+01		PCI/L	02/13/2012 10:38 EST
Ra228	4.03e-02	2.7e+00		PCI/L	02/13/2012 10:38 EST
Th234 *	-2.30e+01	2.2e+01		PCI/L	02/13/2012 10:38 EST
U235 *	-1.70e+01	5.3e+00		PCI/L	02/13/2012 10:38 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01784W	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/28/2012 15:34	1000.0	GE22	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	3.90e-01	1.4e+01		PCI/L	02/13/2012 14:57 EST
Bi214 *	3.46e+02	5.7e+01		PCI/L	02/13/2012 14:57 EST
K40	-2.81e+00	1.2e+01		PCI/L	02/13/2012 14:57 EST
Pb212 *	-6.16e+00	2.2e+00		PCI/L	02/13/2012 14:57 EST
Pb214 *	4.01e+02	5.9e+01		PCI/L	02/13/2012 14:57 EST
Ra226 *	1.48e+01	1.8e+01		PCI/L	02/13/2012 14:57 EST
Ra228	-6.39e-01	4.5e+00		PCI/L	02/13/2012 14:57 EST
Th234 *	-3.15e+01	3.1e+01		PCI/L	02/13/2012 14:57 EST
U235 *	-8.29e+00	6.2e+00		PCI/L	02/13/2012 14:57 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01785X	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/29/2012 10:44	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	3.62e+00	1.3e+01	2.1e+01	PCI/L	02/14/2012 10:33 EST
Bi214 *	3.77e+02	6.5e+01	5.8e+01	PCI/L	02/14/2012 10:33 EST
K40	5.62e+00	1.3e+01	1.9e+01	PCI/L	02/14/2012 10:33 EST
Pb214 *	3.98e+02	7.3e+01	6.8e+01	PCI/L	02/14/2012 10:33 EST
Ra226 *	3.19e+00	3.1e+01	5.3e+01	PCI/L	02/14/2012 10:33 EST
Ra228	9.65e-01	3.2e+00	5.3e+00	PCI/L	02/14/2012 10:33 EST
Th234	-1.15e+02	4.4e+03	3.0e+02	PCI/L	02/14/2012 10:33 EST
U235 *	-7.42e+00	1.2e+01	2.0e+01	PCI/L	02/14/2012 10:33 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01877A	QC batch #:	0008495N
Matrix:	WATER-DRINKING	Assay batch #:	0015743M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.000e+00 L	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/29/2012 15:46	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	5.62e-01	1.4e+01	2.3e+01	PCI/L	02/15/2012 11:36 EST
Bi214 *	6.89e+02	9.0e+01	4.9e+01	PCI/L	02/15/2012 11:36 EST
K40	-3.98e+00	1.5e+01	1.9e+01	PCI/L	02/15/2012 11:36 EST
Pb214 *	7.43e+02	1.0e+02	6.5e+01	PCI/L	02/15/2012 11:36 EST
Ra226 *	-7.10e-01	3.4e+01	5.5e+01	PCI/L	02/15/2012 11:36 EST
Ra228	-7.68e-01	4.4e+00	6.5e+00	PCI/L	02/15/2012 11:36 EST
Th234	-5.75e+01	5.0e+02	3.0e+02	PCI/L	02/15/2012 11:36 EST
U235 *	-2.36e+00	1.3e+01	2.0e+01	PCI/L	02/15/2012 11:36 EST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	LCS-00631915X	QC batch #:	0008495N
Matrix:	N/A	Assay batch #:	0015743M
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/29/2012 02:29	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi207	3.70e+03	4.0e+02	1.2e+01	PCI	12/15/2010 11:00 CST
Bi212	2.30e+00	1.1e+02	1.8e+02	PCI	12/15/2010 11:00 CST
Bi214 *	-5.33e+00	2.6e+01	2.0e+01	PCI	12/15/2010 11:00 CST
Eu155	8.52e+02	1.2e+02	8.4e+01	PCI	12/15/2010 11:00 CST
K40	8.09e+01	4.5e+01	6.7e+01	PCI	12/15/2010 11:00 CST
Pb214 *	-3.29e+00	3.9e+01	3.5e+01	PCI	12/15/2010 11:00 CST
Ra226 *	2.66e+01	2.2e+02	3.7e+02	PCI	12/15/2010 11:00 CST
Ra228	-9.02e+00	6.3e+01	4.6e+01	PCI	12/15/2010 11:00 CST
U235 *	-3.08e+01	7.7e+01	1.2e+02	PCI	12/15/2010 11:00 CST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	RBK-00631916Y	QC batch #:	0008495N
Matrix:	N/A	Assay batch #:	0015743M
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/28/2012 01:58	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Bi212	2.52e+01	3.3e+01	5.4e+01	PCI	02/24/2012 07:00 CST
Bi214 *	3.42e+01	1.5e+01	2.0e+01	PCI	02/24/2012 07:00 CST
K40	-1.70e+01	3.6e+01	5.6e+01	PCI	02/24/2012 07:00 CST
Pb214 *	2.12e+01	1.6e+01	2.3e+01	PCI	02/24/2012 07:00 CST
Ra226 *	-2.58e+01	1.6e+02	1.5e+02	PCI	02/24/2012 07:00 CST
Ra228	9.22e+00	1.0e+01	1.6e+01	PCI	02/24/2012 07:00 CST
Th234	-1.90e+02	1.7e+03	5.2e+02	PCI	02/24/2012 07:00 CST
Tl208	4.35e+00	3.9e+00	5.2e+00	PCI	02/24/2012 07:00 CST
U235 *	5.54e+00	2.9e+01	4.8e+01	PCI	02/24/2012 07:00 CST

* An asterisk indicates a result that may be significantly under or overestimated

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG 1100248

QC BATCH SUMMARY

QC batch #: 0008495N
 Preparation procedure: N/A
 Analysis procedure: NAREL GAM-01

NAREL Sample #	QC Type	Yield (%)	$\pm 2 \sigma$ Uncertainty (%)	Analyst
B2.01731G		N/A		RCL
B2.01732H		N/A		RCL
B2.01733J		N/A		RCL
B2.01734K		N/A		RCL
B2.01735L		N/A		RCL
B2.01736M		N/A		RCL
B2.01737N		N/A		RCL
B2.01761N		N/A		RCL
B2.01762P		N/A		RCL
B2.01763Q		N/A		RCL
B2.01777X		N/A		RCL
B2.01778Y		N/A		RCL
B2.01779Z		N/A		RCL
B2.01780R		N/A		RCL
B2.01780R	DUP	N/A		RCL
B2.01781T		N/A		RCL
B2.01782U		N/A		RCL
B2.01783V		N/A		RCL
B2.01784W		N/A		RCL
B2.01785X		N/A		RCL
B2.01877A		N/A		RCL
LCS-00631915X *	LCS	N/A		RCL
RBK-00631916Y *	RBK	N/A		RCL

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0008495N

Analytical Method: NAREL GAM-01

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity $\pm 2\sigma$	Prep Date	Flags
00631916Y	BI212	2.52e+01 \pm 3.3e+01	2012-02-24	OK
00631916Y	BI214	3.42e+01 \pm 1.5e+01	2012-02-24	J
00631916Y	K40	-1.70e+01 \pm 3.6e+01	2012-02-24	OK
00631916Y	PB214	2.12e+01 \pm 1.6e+01	2012-02-24	J
00631916Y	RA226	-2.58e+01 \pm 1.6e+02	2012-02-24	J
00631916Y	RA228	9.22e+00 \pm 1.0e+01	2012-02-24	OK
00631916Y	TH234	-1.90e+02 \pm 1.7e+03	2012-02-24	OK
00631916Y	TL208	4.35e+00 \pm 3.9e+00	2012-02-24	WARN
00631916Y	U235	5.54e+00 \pm 2.9e+01	2012-02-24	J

LABORATORY DUPLICATES (PCI/L)

Sample ID	Nuclide	Original $\pm 2\sigma$	Duplicate $\pm 2\sigma$	RPD	Z
B2.01780R	BI212	1.36e+01 \pm 1.4e+01	8.42e-01 \pm 4.0e+01	176.68	-0.60 OK
B2.01780R	BI214	2.02e+02 \pm 3.0e+01	1.80e+02 \pm 4.2e+01	11.52	-0.85 OK
B2.01780R	K40	5.63e+00 \pm 1.6e+01	-3.73e+00 \pm 2.9e+01	985.26	-0.56 OK
B2.01780R	PB212	-2.54e+00 \pm 2.6e+00	-7.01e+00 \pm 4.7e+00	0.00	-1.67 OK
B2.01780R	PB214	1.83e+02 \pm 2.7e+01	2.05e+02 \pm 3.9e+01	11.34	0.93 OK
B2.01780R	RA226	-8.99e+00 \pm 3.3e+01	7.41e+00 \pm 3.4e+01	0.00	0.69 OK
B2.01780R	RA228	2.44e+00 \pm 5.3e+00	-1.92e+01 \pm 1.5e+01	0.00	-2.65 OK
B2.01780R	TH234	9.14e+00 \pm 5.4e+01	-9.00e+01 \pm 6.4e+01	0.00	-2.37 OK
B2.01780R	U235	-1.38e+01 \pm 9.3e+00	-1.14e+01 \pm 9.9e+00	0.00	0.35 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added $\pm 2\sigma$	Measured $\pm 2\sigma$	%R	Z
00631915X	BI207	3.95e+03 \pm 3.9%	3.70e+03 \pm 4.0e+02	93.77	-1.14 OK
00631915X	BI212	NO SPIKE DATA			
00631915X	BI214	NO SPIKE DATA			
00631915X	EU155	8.57e+02 \pm 5.7%	8.52e+02 \pm 1.2e+02	99.42	-0.08 OK
00631915X	K40	NO SPIKE DATA			
00631915X	PB214	NO SPIKE DATA			
00631915X	RA226	NO SPIKE DATA			
00631915X	RA228	NO SPIKE DATA			
00631915X	U235	NO SPIKE DATA			

Analyst:

PC Joury

3-5-12

R. Michele Doss 3-5-12

QA Officer:

Carl J. Miller

3/5/12

with J flags - 100% 3/5/12